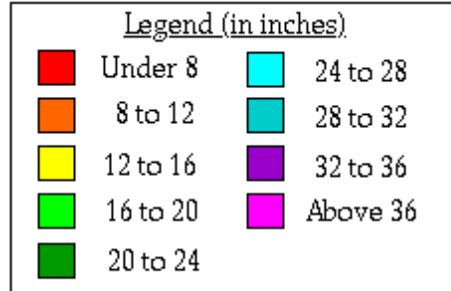


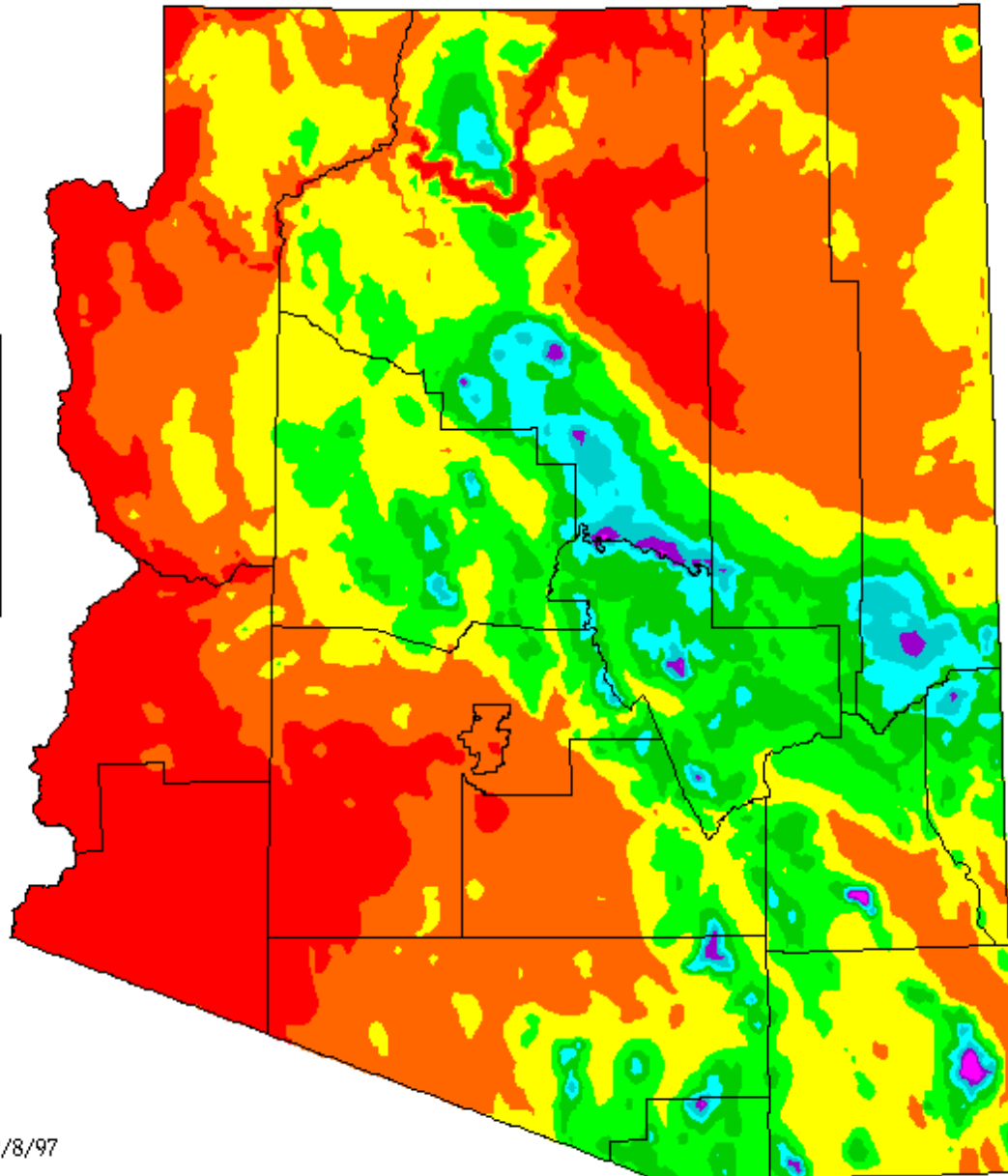
# Average Annual Precipitation

## Arizona



Period: 1961-1990

This map is a plot of 1961-1990 annual average precipitation contours from NOAA Cooperative stations and (where appropriate) USDA-NRCS SNOTEL stations. Christopher Daly used the PRISM model to generate the gridded estimates from which this map was derived; the modeled grid was approximately 4x4 km latitude/longitude, and was resampled to 2x2 km using a Gaussian filter. Mapping was performed by Jenny Weisburg. Funding was provided by USDA-NRCS National Water and Climate Center.

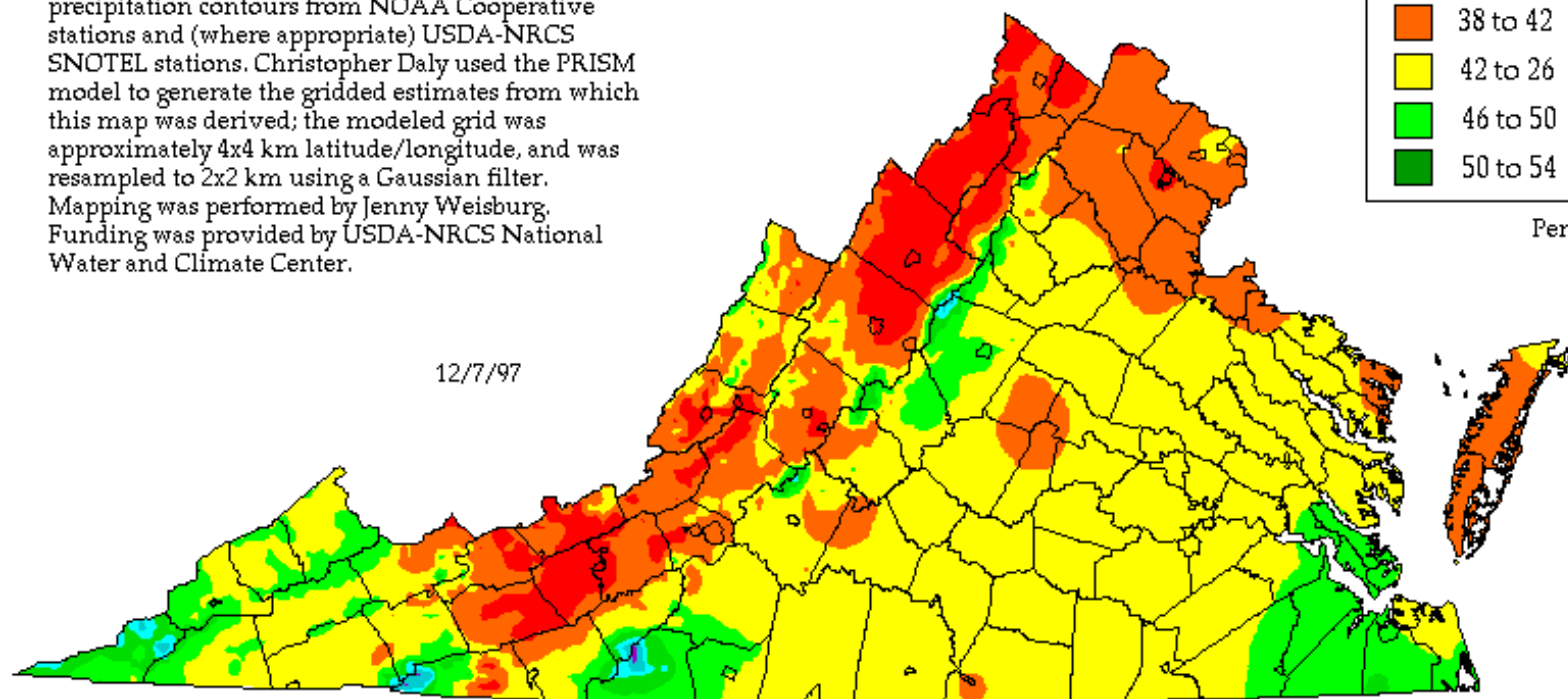


12/8/97

## Average Annual Precipitation Virginia

This map is a plot of 1961-1990 annual average precipitation contours from NOAA Cooperative stations and (where appropriate) USDA-NRCS SNOTEL stations. Christopher Daly used the PRISM model to generate the gridded estimates from which this map was derived; the modeled grid was approximately 4x4 km latitude/longitude, and was resampled to 2x2 km using a Gaussian filter. Mapping was performed by Jenny Weisburg. Funding was provided by USDA-NRCS National Water and Climate Center.

12/7/97



### Legend (in inches)

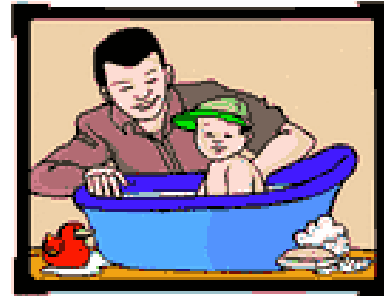
Under 38	54 to 58
38 to 42	58 to 62
42 to 46	62 to 66
46 to 50	Above 66
50 to 54	

Period: 1961-1990

# Not Graywater



This is:



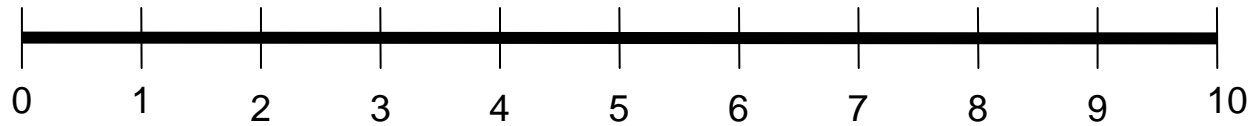
# Terms and Definitions

- Gray water
- Black water
- Sewage
- Effluent
- Wastewater
- Non-potable water
- Reclaimed water
- Reuse water

# And one more layer of complexity:

- **Virginia Department of Conservation and Recreation**
  - Erosion and sediment control
- **Virginia Department of Environmental Quality**
  - Division of Wastewater Engineering
- **Virginia Department of Housing and Community Development**
  - Local building official offices
- **Virginia Department of Health**
  - Local health departments
  - Office of Environmental Health Services
  - Office of Drinking Water

**Drinking  
Water**



**Wastewater  
Sewage**



**Reclaimed  
Water**

**Graywater**

**Blackwater**

# What's in Gray water?

## Bath, Basin, Shower

- Hair
- Soaps
- Shampoos
- Hair dyes
- Toothpaste
- Lint
- Body fats
- Oils
- Cleaning Products
- Pathogens from washing

## Laundry

- Hair
- Lint
- Oils & greases
- Detergents
- Cleaning Products
- Fecal contamination



















# Graywater Production

	Gallons/House/Day	Gallons/Person/Day
Graywater	90 - 120	30 - 50
Blackwater	58 - 80	19 - 30



## **Viruses**

- 1. Over 100 enteric viruses excreted in the feces of man.**
- 2. Filtration by the soil is minimal because of their small size (< 250 nm).**
- 3. Can initiate significant waterborne disease.**
- 4. Presence of aerobic microbes reduces survival rates.**



## **Bacteria**

- 1. Typical concentration of  $4.2 \times 10^7$  organisms in STE.**
- 2. Adsorption and filtration reduce survival rates (well-drained fine medium textured soils helps greatly).**
- 3. Movement in coarse textures or high water tables may be significant.**

**Table 3.1 Recommended Maintenance for Greywater Diversion Devices**

GDD Component	Maintenance Required	Frequency
Filter	Clean filter <ul style="list-style-type: none"> <li>– filter should be removed and cleaned, removing physical contaminants (sand, lint, hair, etc.)</li> </ul>	Weekly
	Replace filter	As recommended by manufacturer or as required (usually every 6 – 12 months)
Surge tank	Clean out sludge from surge tank	Every 6 months
Sub-surface irrigation distribution system	Check that water is dispersing <ul style="list-style-type: none"> <li>– regularly monitor soil to ensure all areas are wet after an irrigation period.</li> </ul>	Weekly
Soil condition	Check that soil is healthy. Signs of unhealthy soil include: <ul style="list-style-type: none"> <li>– damp and boggy ground hours after irrigation</li> <li>– surface ponding and run-off of irrigated water</li> <li>– poor vegetation growth</li> <li>– unusual odours</li> <li>– clumping of soil</li> <li>– fine sheet of clay covering surface</li> </ul>	Monthly

# Operation and Maintenance

- ✗ **DON'T** leave a diversion device on all the time. Treat it like a garden tap and only reuse greywater when the garden needs watering. Greywater is for reuse, not disposal.
- ✗ **DON'T** reuse toilet or kitchen wastewater.
- ✗ **DON'T** reuse greywater during rain.
- ✗ **DON'T** reuse greywater from the washing of nappies or contaminated clothing.
- ✗ **DON'T** reuse greywater when a resident is sick, e.g. has diarrhoea.
- ✗ **DON'T** reuse greywater generated by cleaning in the laundry or bathroom, or when using hair dye or other chemicals.



# Operation and Maintenance

- ✗ **DON'T** reuse greywater generated by washing rags used for painting or for maintaining machinery and vehicles.
- ✗ **DON'T** reuse greywater to top up rainwater tanks or swimming pools.
- ✗ **DON'T** store untreated greywater.
- ✗ **DON'T** over-water.
- ✗ **DON'T** irrigate with greywater if the household is located on an aquifer that is used for drinking water
- ✗ **DON'T** reuse greywater on plants that will be eaten raw or where fruit has fallen to the ground and could be eaten.
- ✗ **DON'T** use greywater to wash paths, driveways or cars.
- ✗ **DON'T** allow direct contact or ingestion of the greywater.
- ✗ **DON'T** use greywater to irrigate on dune sand or shallow rocky soil unless the soil has been enriched to a minimum 300mm in depth.
- ✗ **DON'T** reuse greywater so that it flows into the streets or down stormwater drains.
- ✗ **DON'T** install drippers of a sub-surface irrigation system within one metre of boundary lines, inground pools and inground potable water tanks and buildings.
- ✗ **DON'T** let greywater go beyond the property boundary and cause a nuisance to neighbours.
- ✗ **DON'T** use greywater in households where immuno-suppressed occupants are present.

# Operation and Maintenance

- ✓ **DO** select washing detergents that are low in salt – consider using a powder concentrate, or a liquid washing detergent.
- ✓ **DO** monitor plant and soil response to greywater irrigation.
- ✓ **DO** occasionally irrigate with drinking water to disperse salts from the soil (only appropriate during extended periods of zero rainfall).
- ✓ **DO** consider applying a soil rewetting agent every six months.
- ✓ **DO** ensure that regular maintenance of the greywater system is undertaken.